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JUNE 16, 1986

CHEMICAL & ENGINEERING

NEWS

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Chemistry in the Thermosphere

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CHEMICAL & ENGINEERING
NEWS

Volume 64, Number 24
CENEAR 64 (24) 1–60
ISSN 0009-2347

JUNE 16, 1986

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Cover: Aurora borealis in northern sky. Photo courtesy of Geophysical Institute, University of Alaska

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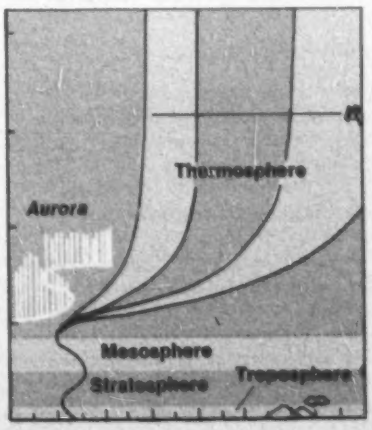


Special Report

Knowledge of the thermosphere, where temperature increases with altitude, and the ionosphere, which produces magnetic disturbances on the ground, has increased since the rocket and satellite probes of the 1950s. **Page 23**

U.S. Chemical Firms' Capital Spending Abroad To Increase

According to latest Department of Commerce survey, such spending this year will rise about 22% from 1985 to $3.22 billion

William J. Storck, C&EN New York

After a number of years in the doldrums, capital expenditures by foreign affiliates of U.S. chemical companies are forecast to show a healthy increase this year, according to the Commerce Department's latest survey of spending plans for new plant and equipment overseas.

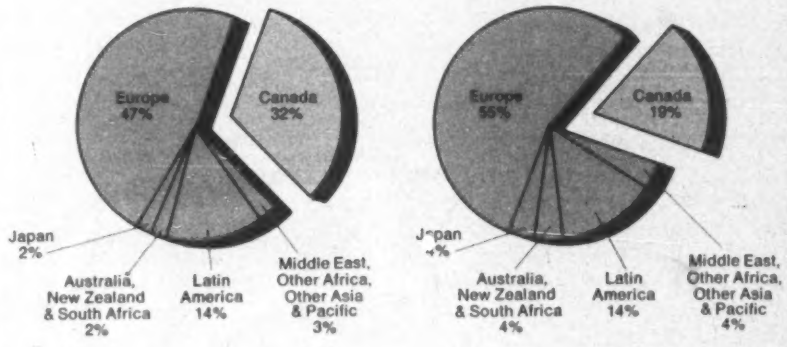
The survey, based on figures gathered at beginning of 1986, indicates that such spending abroad this year will rise 22% from 1985 to almost $3.22 billion. Although that projection is down 5% from an estimate made six months earlier, the projected rate of increase is still well above the 0.5% increase actually achieved in 1985. And the 22% rise is well above the forecast for the increase in total capital spending by chemical companies in 1986, estimated at just 5.5% over 1985.

It is not unusual for the estimate to fall during the year as companies face economic reality. In the 1981–85 period, only 1981 spending turned out higher than was first forecast, and it was only 3% higher. When the final tallies were in, spending for 1982 through 1984 was more than 20% less than first forecast, and 1985 spending was 11% less. The same pattern has prevailed recently for all industries.

A commentary on the survey, written by Commerce Department analyst Jeffrey H. Lowe, says of the total survey: "The downward adjustment for 1985 continues a recent pattern in which spending estimates made near the end of the year are much lower than those made six months earlier. The pattern, established during a period of prolonged sluggish growth abroad, largely results from the cancellation of some projects and the deferral of others into the following year."

This year might prove another exception to the pattern, however. "Spending plans in manufacturing industries in 1986 may be revised up if the recent steep decline in oil prices leads to better-than-expected economic growth abroad," Lowe says. "In particular, the price decline may have a positive effect on chemical affiliates, because petroleum feedstocks represent a significant portion of their production costs."

Canada's spending has lost ground to other areas


Europe 47%
Canada 32%
Japan 2%
Australia, New Zealand & South Africa 2%
Latin America 14%
Middle East, Other Africa, Other Asia & Pacific 3%
1977 total = $2.307 billion
Europe 55%
Canada 19%
Japan 4%
Australia, New Zealand & South Africa 4%
Latin America 14%
Middle East, Other Africa, Other Asia & Pacific 4%
1986 total = $3.218 billion

Source: Commerce Department

Final capital spending is usually lower than first forecast

	% change from first forecast[a]					
	1986	1985	1984	1983	1982	1981
Developed countries	−1%	−11%	−20%	−19%	−19%	−28%
Canada	−8	−16	−48	−8	8	−34
Europe	9	−7	−3	−22	−29	−24
Japan	−13	−10	9	11	27	−50
Australia, New Zealand, and South Africa	−10	−35	−20	−24	−41	−15
Developing countries	−18	−9	−21	−37	−44	−5
Latin America	−27	−8	−20	−43	−50	12
Other Africa	−19	0	−36	−55	na	na
Middle East	0	−38	40	0	na	na
Other Asia and Pacific	47	−14	−27	−8	−9	−6
Average change	−5%	−11%	−20%	−23%	−25%	3%

a % change between first forecast and final numbers when available. Figures for 1986 are for first and latest forecasts. Figures for 1985 are for first forecast and latest estimate. na = not available. Source: Commerce Department

After years of depressed spending, foreign capital expenditures are slated to pick up this year

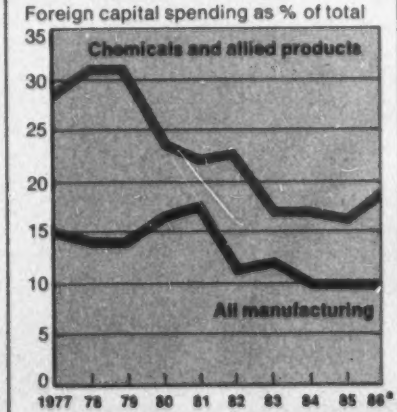
$ millions, for chemicals and allied products	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977
Developed countries	$2641	$2149	$2146	$1903	$2529	$2304	$2356	$2625	$2026	$1923
Canada	625	471	507	425	862	655	494	921	752	732
Europe	1773	1480	1440	1285	1476	1475	1701	1475	1115	1086
Japan	129	99	100	78	90	70	88	163	91	49
Australia, New Zealand, and South Africa	114	99	99	115	101	104	73	66	68	56
Developing countries	577	483	474	417	534	664	608	725	434	384
Latin America	432	371	377	303	400	542	511	435	345	324
Other Africa	13	14	7	9	12	6	8	11	10	9
Middle East	10	5	7	6	4	5	20	23	30	21
Other Asia & Pacific	122	93	83	99	118	111	69	256	49	30
Total	$3218	$2632	$2620	$2320	$3063	$2968	$2964	$3350	$2460	$2307
% change	22.3%	0.5%	12.9%	−24.3%	3.2%	0.1%	−11.5%	36.2%	6.6%	−15.6%

Note: Capital spending by majority-owned foreign affiliates of U.S. companies. **Source:** Commerce Department

Even if the chemical affiliates spend what they are planning or even a little more than what they intend to spend this year, foreign capital expenditures still will be below the record in 1979. The current forecast of $3.22 billion for 1986 is almost 4% less than spending in 1979. Given intervening inflation, capital expenditures in real dollars are thus far below their historic high.

Another measure showing that foreign capital spending is considerably below traditional levels is its relationship to another Commerce Department survey of total capital spending by U.S. chemical companies. Foreign spending by U.S. companies will be about 19% of total capital spending, according to the latest Commerce Department forecast. That percentage is up from last year's 16%, but considerably less than the 30% range where the ratio was running in the second half of the 1970s. Even in the first three years of the 1980s, the ratio still was more than 20%.

Foreign spending remains low as percent of total



The declines in chemical capital spending abroad in relation to both historic rates and to total capital spending may indicate a number of economic factors. The first is simply that foreign spending is not so important to companies as they once thought. In the past few years, some chemical analysts were saying that, because of the high value of the dollar against foreign currencies, U.S. chemical companies would have to build overseas to compete. At least some of those analysts are now changing their tune and adopting the more traditional advice of building where the feedstock and expertise are—in other words, where the company can produce at the lowest cost.

A second factor is that fewer companies are making big investments overseas. Many chemical companies, such as Monsanto and Union Carbide, have much less of an overseas presence than they did in the 1970s and therefore are spending little if anything overseas.

A third, and probably most important, reason for the near term is that the foreign economic situation is about the same as that in the U.S., and in some countries it is worse. Faced with stagnant markets in many high-use areas, chemical companies have no need to build new plants and thus must content themselves with maintaining and upgrading existing plants.

As is traditional, the vast majority of capital expenditures by chemical affiliates in 1986 will go to industrialized countries, specifically those in Europe. Over the years industrialized countries have received a little more than 80% of spending on new plant and equipment, and developing nations have received the remaining 20% or so. In 1986, industrialized countries are forecast to get 82% of spending, the same as in both 1984 and 1985.

Nevertheless, the breakdown of spending among developed countries has changed. In the mid-1970s, Canada, the U.S.'s largest single trading partner, received about 32% of total foreign capital spending and about 38% of foreign capital spending within developed countries. At the same time, Europe received 47% of total foreign capital spending and almost 57% of that spent within developed nations. But in the 1986 forecast, Canada's share has declined to 19% of total foreign capital spending and 24% of that spent in developed countries, and Europe's share has grown to 55% of total foreign spending and 67% of total developed country spending for chemicals. Nonetheless, Canada still will get a healthy increase, according to the forecast for this year, rising almost 33% from 1985 to $625 million. □